

Healthcare industry BW

Patent versus publication: setting up start-ups in the sciences

When it comes to universities as start-up incubators, the Massachusetts Institute of Technology (MIT) in the USA is often used as a prime example of entrepreneurial impact. Well over 100 high-tech spin-offs have been set up in the vicinity of the renowned university¹. Many German universities also offer attractive conditions for scientists with an entrepreneurial spirit. According to current university rankings^{2,3}, research institutions in Munich, Berlin, Oldenburg and Lüneburg offer particularly favourable environments for university spin-offs.

Professors who support the entrepreneurial ambitions of their staff or have such ambitions themselves play a particularly important role in whether a university spin-off is successful or not. Prof. Dr. Magnus von Knebel Doeberitz, medical director of the Department of Applied Tumour Biology at Heidelberg University Hospital, is one such professor. He initiated a DKFZ spin-off called mtm laboratories, and is also involved in the establishment of a new start-up company called ViMREX. Prof. von Knebel Doeberitz talked about his experiences as a company founder, whether science and entrepreneurship is compatible and explained what he thinks has to change in Germany to make setting up university spin-offs more popular than it is at present.

From professor to company founder

Back in 1997, Prof. Dr. Magnus von Knebel Doeberitz and his team made a discovery that led to the establishment of a start-up company and, in 2011, to the sale of the company to the pharmaceutical giant Roche for a price tag of 190 million euros. Von Knebel Doeberitz's company is therefore a prime example of a successful university spin-off. However, the road to becoming a successful spin-off was littered with obstacles. "As a medical doctor, I am not very familiar with management issues, and I have therefore always seen myself more as a consulting scientist rather than a managing director," said von Knebel Doeberitz. However, he does not wish to withhold scientific knowledge, and feels duty bound to give something back to society. "After all, our research is being paid for with tax-payers' money and should therefore create added value for society, whether in the form of new technologies, treatment methods or vaccines," says von Knebel Doeberitz.

When von Knebel Doeberitz and his team discovered in 1997 that a particular protein (p16INK4a) could be used as a biomarker in human papillomavirus (HPV) infections, they were convinced that the protein had the potential to become a marketable product. After their discovery had been



Prof. Dr. von Knebel Doeberitz from Heidelberg University Hospital.
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patented, the team had to seek investors, an undertaking that turned out to be difficult in the extreme. "Although several companies expressed their interest in the protein, the licensing deals were not very attractive and would certainly not have led to successful product development," said von Knebel Doeberitz. So the team got creative and started their own venture fund along with a start-up company called mtm laboratories. After completing a first successful round of financing with their own investments, more and more investors became aware of the start-up and expressed their interest in supporting the company with extra funds. mtm laboratories was able to conclude several other financing rounds, and the protein p16INK4a turned out to be an ideal marker of HPV-transformed cells.

The team went on to develop two major product lines based on the p16INKa biomarker: an assay for detecting precancerous lesions in tissue sections (histology) and an assay for the highly accurate identification of HPV infections or precancerous cellular changes in smear samples (cytology). These are alternatives to the traditional PAP smear test, which is more prone to errors. In 2005, product development was completed and the

products underwent large-scale clinical testing. The products were presented at conferences and attracted the interest of large pharmaceutical companies. mtm laboratories ended up being sold to Roche in 2011.

Scientist and CEO? This combination is still quite rare in Germany



Quelle: eigene Darstellung nach [5] und [6]

Different types of start-ups in 2016, the motives for establishing companies, and obstacles encountered on the way to company establishment.

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In Germany, the link between science and the private sector is less pronounced than it is in other OECD countries. While the USA started promoting the establishment of companies by scientists as early as the 1950s, many German universities have only relatively recently established departments specialising in business foundations or incubators. Germany does not have huge research and spin-off clusters such as Silicon Valley or the Harvard MIT Center with their many financially well-equipped research institutions and institutes⁴.

In Germany, scientists who want to establish their own business often simply lack the infrastructure and venture capital required to bring a good idea from research to market. However, mentality also plays an important role, as von Knebel Doeberitz says: "While a large number of people in the USA have invested their money in stock, the same is true only for a small fraction of the German population. Germans prefer to take a no-risk strategy, an attitude that makes it very difficult for start-up companies to acquire capital or find investors." Von Knebel Doeberitz also criticises the fact that most investors in Germany are large ones that love staging investments to a larger audience, and very few small investors interested in investing in innovative ideas. Von Knebel Doeberitz also believes that the German government fails to create incentives for risk investments, for example in the form of tax benefits for investors. Moreover, Germany lacks experienced professionals who know how to establish companies effectively. "A comprehensive patent search is absolutely crucial for a project's success," said von Knebel Doeberitz recalling the initial phase of mtm laboratories' foundation. "Many scientists have no idea how to successfully file a patent application, design a product or write a business plan."

In the USA, almost every university has a technology transfer office and patent attorneys who provide advice to interested students and scientists. This is a clear advantage. However, this is only possible because US universities are private institutions which, in contrast to the public universities in Germany, have adequate funds for doing so. So it comes as no surprise that a study commissioned by the German Federal Ministry of Education and Research (BMBF) on public research spin-offs in Germany has found that a weak capital base is the biggest barrier to setting up a business. Moreover, the companies questioned said that the lack of qualified personnel constitutes the second largest barrier. Permit procedures and legislation are also seen to hinder the establishment of spin-offs⁵.

Outlook

In spite of start-up conditions that are less than ideal, a good 15% of start-ups in Germany in 2016 were spin-offs from universities and research institutions⁶. Many company founders that took part in the survey cited the prospect of working independently and the clear demand for a product as

the major motives for establishing a company⁵. Moreover, the understanding that in the field of medical research, scientific knowledge only benefits patients when it is turned into medical products seems to motivate a growing number of scientists to choose the path of entrepreneurship. "If, for example I can develop a new vaccine, then it is my civic duty to do so and make it available to the public," said von Knebel Doeberitz.

At present, von Knebel Doeberitz is working alongside his wife and another co-worker to establish a start-up company called ViMREX, based on the discovery of various compounds that can inhibit HPV-induced oncogenes. The three company founders hope to officially establish ViMREX in 2018 with the support of the BMBF's EXIST programme. In addition, von Knebel Doeberitz is very active in the field of vaccine development. However, in this particular case he has transferred the product development process to the USA where he works closely with local experts. "I am aware that this contributes to the brain drain, but the required infrastructure is better in the USA, and staff with experience of start-up issues are much easier to find than here in Germany," said the professor. It is to be hoped that conditions in Germany will change over the next few years so that the migration of innovative, qualified people can be prevented. The goals are clearly defined in the BMBF's⁷ high-tech strategy, and the recently developed "Innovative University" funding programme is aimed at supporting the research-based transfer of ideas, knowledge and technologies. Now it remains to be seen whether the implementation of these goals will be successful.

References:

- [1] Wirtschaftswoche: Bundesregierung will Ausgründungen an Universitäten stärker fördern. Online unter: <http://www.wiwo.de/politik/deutschland/universitaeten-bundesregierung-will-ausgruendungen-an-hochschulen-staerker-foerdern/9715726.html> [18th January 2018]
- [2] Gründerszene: Gründerszene-Ranking: Die Top Start-Up Unis Deutschland. Online at: <https://www.gruenderszene.de/allgemein/top-startup-unis> [18th January 2018]
- [3] Schmude, J./ Aevermann, T./ Heumann, S. (2011): Vom Studenten zum Unternehmer: Welche Universität bietet die besten Chancen?: Gründerlehre-Aktive Unterstützung-Rahmenbedingungen. LMU Munich. 56 pages.
- [4] Sogorski, L. (2012): Ausgründungen: In den USA wachsen Ableger besser. Handelsblatt GmbH. Online at: <http://www.karriere.de/karriere/in-den-usa-wachsen-ableger-besser-166517/> [18th January 2017]
- [5] BMBF (2002): Report: Public Research Spin-offs in Germany. 66 pages.
- [6] KPMG (2016): Deutscher Start-Up Monitor 2016: Der perfekte Start. Online at: http://deutscherstartupmonitor.de/fileadmin/dsm/dsm-16/studie_dsm_2016.pdf [18th January 2018]
- [7] German Federal Ministry of Education and Research (2017): The new high-tech strategy. Innovations for Germany. Online at: https://www.bmbf.de/pub/HTS_Broschuere_eng.pdf [18th January 2018]
- [8] BMBF (2017): Innovative Hochschule. Online at: <https://www.bmbf.de/de/innovative-hochschule-2866.html> [18th January 2018]

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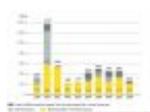
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